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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample and a personnel evaluation form are also included. (AG)

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S-285 United States Employment Service Technical Report August 1966

Development of USES Aptitude Test Battery for Dental-Laboratory Technician

(medical ser.) 712.381

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Washington, D.C. 20210

ED 065631

Technical Report on Development of USES Aptitude Test Battery

For .....

Dental-Laboratory Technician (medical ser.) 712.381

S-285

U. S. Employment Service
in Cooperation with
Pennsylvania, Tennessee and Wisconsin
State Employment Services

August 1966

GATB Study #2470,
2497, 2618

DEVELOPMENT OF USES APTITUDE TEST BATTERY

For

Dental-Laboratory Technician (medical ser.) 712.381

S-285

This report describes research undertaken for the purpose of developing General Aptitude Test Battery (GATB) norms for the occupation of Dental-Laboratory Technician (medical ser.) 712.381. The following norms were established:

GATB Aptitude	Minimum Acceptable GATB, B-1002 Scores
S - Spatial Aptitude	80
P - Form Perception	80
K - Motor Coordination	80
M - Manual Dexterity	85

RESEARCH SUMMARY - VALIDATION SAMPLE

Sample:

56 (11 female and 45 male) workers employed as Dental-Laboratory Technician in dental laboratories in Pennsylvania.

Criterion:

Supervisory ratings.

Design:

Concurrent (test and criterion data were collected at approximately the same time).

Minimum aptitude requirements were determined on the basis of a job analysis and statistical analyses of aptitude mean scores, standard deviations, and selective efficiencies.

Concurrent Validity:

Phi Coefficient = .38 ($P/2 < .005$)

Effectiveness of Norms:

Only 66% of the non-test-selected workers used for this study were good workers; if the workers had been test-selected with the above norms, 78% would have been good workers. 34% of the non-test-selected workers used for this study were poor workers; if the workers had been test-selected with the above norms, only 22% would have been poor workers. The effectiveness of the norms is shown graphically in Table 1:

TABLE 1

Effectiveness of Norms

	Without Tests	With Tests
Good Workers	66%	78%
Poor Workers	34%	22%

VALIDATION SAMPLE DESCRIPTION

Size: N = 56

Occupational Status: Employed workers

Work Setting: Workers were employed by the following Dental Laboratories in Pennsylvania:

Dental Laboratory	Location
J. H. Buckley Dental Laboratory	Pittsburgh
DeLux Dental Laboratory	Reading
East End Dental Laboratory	Pittsburgh
Gracey Dental Laboratory	Pittsburgh
Hartman Dental Laboratory	Pittsburgh
Hoffman Dental Laboratory	Reading
Protas Dental Laboratory	Pittsburgh
Sandler Dental Laboratory	Allentown
Williams Dental Laboratory	Erie

Employer Selection Requirements:

Education: High school graduates preferred.

Previous Experience: No requirement

Tests: None used

Other: Personal interview and check of references

Principal Activities: The job duties for each worker are those shown in the Appendix for the validation sample.

Minimum Experience: All workers were considered experienced.

TABLE 2

Means, Standard Deviations (SD), Range, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

	Mean	SD	Range	r
Age (years)	36.5	10.0	20-67	.060
Education (years)	10.4	1.8	6-14	.199
Experience (months)	154.3	111.8	2-384	.359**

**Significant at the .01 level

EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002, were administered to the validation sample (48 workers were tested with Form A and 8 with Form B) during the period September 1959 through March 1963.

CRITERION

The criterion data consisted of supervisory ratings of job proficiency. Only one set of ratings was obtained.

Rating Scale: USES Form SP-21, "Descriptive Rating Scale." This scale (see Appendix) consists of nine items covering different aspects of job performance. Each item has five alternatives corresponding to different degrees of job proficiency.

Reliability: No measure of criterion reliability but the usual rate-rerate reliability for this scale is about .90.

Criterion Score Distribution:

Possible Range:	9-45
Actual Range:	25-45
Mean:	34.8
Standard Deviation:	5.5

Criterion Dichotomy: The criterion was dichotomized into low and high groups by placing 34% of the sample into the low group to correspond with the percentage of workers considered unsatisfactory or marginal workers in the high criterion group were designated as "good workers" and those in the low group as "poor workers." The criterion critical score is 33.

APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were selected for tryout in the norms on the basis of a qualitative analysis of job duties involved and a statistical analysis of test and criterion data. Aptitudes P and K which do not have a high correlation with the criterion were considered for inclusion in the norms because the qualitative analysis indicated that they were important for the job duties and the sample had relatively high mean scores on these aptitudes. With employed workers, a relatively high mean score may indicate that some sample pre-selection had taken place. Tables 3, 4, and 5 show the results of the qualitative and statistical analysis.

TABLE 3

Qualitative Analysis
(Based on the job analysis, the aptitudes indicated appear to be important to the work performed.)

Aptitude	Rationale
G - General Learning Ability	Required in following written and oral instructions and in making independent judgments regarding design of prosthetic dental appliances.
S - Spatial Aptitude	Required in visualizing and sketching outline of prosthetic dental appliance on stone model of upper and lower jaws using impressions as guides; and in visually checking proper movement and fit of upper and lower jaw models to determine proper alignment and to approximate position and function of appliance being made.
P - Form Perception	Required in recognizing minute irregularities of plaster molds and their effect on proper fitting of subsequent plates or appliances in the patient's mouth; and in making accurate visual inspection of models when positioned in jaws of articulator to ascertain if models of oral cavities are in exact alignment and that no undercuts are evident at the base of the teeth.
K - Motor Coordination	Required in using buffing and grinding equipment to finish a variety of work pieces.
M - Manual Dexterity	Required in using electrically operated tools and other hand tools, such as brushes, knives, scrapers, chisels, grinding and buffing wheels, to build wax impressions of prosthetic dental appliances.

TABLE 4

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 56

Aptitude	Mean	SD	Range	r
G - General Learning Ability	95.9	14.7	58-128	.276*
V - Verbal Aptitude	96.8	14.1	70-129	.134
N - Numerical Aptitude	92.2	16.2	46-128	.121
S - Spatial Aptitude	99.8	16.7	55-140	.285*
P - Form Perception	100.3	16.6	42-136	.157
Q - Clerical Perception	99.3	13.2	67-136	-.128
K - Motor Coordination	105.0	17.6	70-161	.202
F - Finger Dexterity	98.0	16.5	70-140	.260
M - Manual Dexterity	110.2	21.6	65-167	.352**

*Significant at the .05 level
**Significant at the .01 level

TABLE 5

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important	X			X	X		X		X
Irrelevant									
Relatively High Mean				X	X		X		X
Relatively Low Standard Dev.	X	X				X			
Significant Correlation with Criterion	X			X					X
Aptitudes to be Considered for Trial Norms	G			S	P		K		M

DERIVATION AND VALIDITY OF NORMS

Final norms were derived on the basis of a comparison of the degree to which trial norms consisting of various combinations of aptitudes G, S, P, K, and M at trial cutting scores were able to differentiate between the 66% of the sample considered good workers and the 34% of the sample considered poor workers. Trial cutting scores at five point intervals approximately one standard deviation below the mean are tried because this will eliminate about one-third of the sample with three-aptitude norms. For two-aptitude trial norms, minimum cutting scores of slightly higher than one standard deviation below the mean will eliminate about one-third of the sample; for four-aptitude trial norms, cutting scores of slightly lower than one standard deviation below the mean will eliminate about one-third of the sample. The Phi Coefficient was used as a basis for comparing trial norms. Norms of S-80, P-80, K-80, and M-85 provided the highest degree of differentiation for the occupation of Dental-Laboratory Technician (med. ser.) 712.381. The validity of these norms is shown in Table 6 and is indicated by a Phi Coefficient of .38 (statistically significant at the .005 level).

TABLE 6

Concurrent Validity of Test Norms
S-80, P-80, K-80, M-85

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Workers	6	31	37
Poor Workers	10	9	19
Total	16	40	56

Phi Coefficient (ϕ) = .38 Chi Square (X^2) = 8.18
Significance Level = $P/2 < .005$

DETERMINATION OF OCCUPATIONAL APTITUDE PATTERN

The data for this study met the requirements for incorporating the occupation studied into OAP-28 which is shown in Section II of the Manual for the General Aptitude Test Battery. A Phi Coefficient of .41 is obtained with the OAP-28 norms of S-75, P-75, M-75.

S-285 GATB #2497

Dental-Laboratory Technician (medical ser.) 712.381

Check Study #1 Research Summary

Sample:
54 workers (50 males and 4 females) employed as Dental-Laboratory Technicians in Tennessee.

TABLE 7

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience - Cross-Validation Sample #1.

	Mean	SD	Range	r
Age (years)	32.0	7.4	20-47	.329*
Education (years)	10.5	1.9	5-13	.218
Experience (months)	139.7	87.1	8-372	.476**

*Significant at the .05 level
**Significant at the .01 level

Criterion:
Supervisory ratings

Design:
Concurrent (test and criterion data were collected at approximately the same time).

Principal Activities:
The job duties for each worker are those shown in the Appendix.

Concurrent Validity:
Phi Coefficient = .29 ($P/2 < .025$)

Effectiveness of Norms:
Only 67% of the non-test-selected workers used for this study were good workers; if the workers had been test-selected with the S-285 norms, 81% would have been good workers. 33% of the non-test-selected workers used for this study were poor workers; if the workers had been test-selected with the S-285 norms, only 19% would have been poor workers. The effectiveness of the norms when applied to this independent sample is shown graphically in Table 8:

TABLE 8

Effectiveness of S-285 Norms on Check Study Sample #1

	Without Tests	With Tests
Good Workers	67%	81%
Poor Workers	33%	19%

Check Study #1 (Tennessee)

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 54

Aptitude	Mean	SD	Range	r
G - General Learning Ability	90.7	17.9	55-130	.418**
V - Verbal Aptitude	91.7	14.4	63-127	.385**
N - Numerical Aptitude	86.1	15.3	51-120	.259
S - Spatial Aptitude	98.0	20.1	61-143	.348**
P - Form Perception	92.4	16.8	59-140	.206
Q - Clerical Perception	93.2	13.3	68-135	.228
K - Motor Coordination	95.0	14.4	58-128	.254
F - Finger Dexterity	93.8	16.8	49-134	.186
M - Manual Dexterity	98.0	20.5	46-139	.141

**Significant at the .01 level

Concurrent Validity of Test Norms
(S-80, P-80, K-80, M-85)
Check Study Sample #1 (Tennessee)

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Workers	15	21	36
Poor Workers	13	5	18
Total	28	26	54

Phi Coefficient (ϕ) = .29

Chi Square (X^2) = 4.482

Significance Level = P/2 $<$.025

S-285 GATB #2618

Check Study #2 Research Summary

Sample:
54 workers (5 female and 49 male) employed as Dental-Laboratory Technicians in Wisconsin.

TABLE 9

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience - Cross-Validation Sample #2.

	Mean	SD	Range	r
Age (years)	35.8	12.8	19-60	.030
Education (years)	11.2	1.7	7-15	.067
Experience (months)	152.5	131.2	7-468	.172

Criterion:
Supervisory ratings

Design:
Concurrent (Test and criterion data were collected at approximately the same time).

Principal Activities:
The job duties for each worker are comparable to those shown in the job description in the Appendix.

Concurrent Validity:
Phi Coefficient (Ø) = .47

Effectiveness of Norms:
Only 65% of the non-test-selected workers used for this study were good workers; if the workers had been tested with the S-285 norms, 81% would have been good workers. 35% of the non-test-selected workers used in this study were poor workers; if the workers had been test-selected with the S-285 norms, only 19% would have been poor workers. The effectiveness of the norms is shown graphically in table 10.

TABLE 10

Effectiveness of S-285 Norms on Check Study Sample #2

	Without Tests	With Tests
Good Workers	65%	81%
Poor Workers	35%	19%

Check Study Sample #2 (Wisconsin)

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 54

Aptitudes	Mean	SD	Range	r
G - General Learning Ability	101.1	16.1	58-146	.252
V - Verbal Aptitude	99.2	14.5	70-133	.097
N - Numerical Aptitude	94.0	14.2	60-137	.228
S - Spatial Aptitude	108.6	17.4	65-147	.271*
P - Form Perception	101.3	19.0	64-145	.066
Q - Clerical Perception	97.3	12.2	70-128	.197
K - Motor Coordination	98.4	17.6	66-136	.211
F - Finger Dexterity	102.4	22.0	60-160	.175
M - Manual Dexterity	114.5	24.0	60-155	.239

*Significant at the .05 level

Concurrent Validity of Test Norms
(S-80, P-80, K-80, M-85)
Check Study Sample #2 (Wisconsin)

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Workers	6	29	35
Poor Workers	12	7	19
Total	18	36	54

Phi Coefficient (ϕ) = .47

Chi Square (X^2) = 11.726

Significance Level = P/2 $<$.0005

SP-21
Rev. 2/61

A-P-P-E-N-D-I-X

DESCRIPTIVE RATING SCALE
(For Aptitude Test Development Studies)

Score____

RATING SCALE FOR _____
D. O. T. Title and Code

Directions: Please read Form SP-20, "Suggestions to Raters", and then fill in the items listed below. In making your ratings, only <u>one</u> box should be checked for each question.

Name of Worker (print) _____
(Last) (First)

Sex: Male_____ Female_____

Company Job Title: _____

How often do you see this worker in a work situation?

☐ **See him at work all the time.**

☐ **See him at work several times a day.**

☐ **See him at work several times a week.**

☐ **Seldom see him in work situation.**

How long have you worked with him?

☐ **Under one month.**

☐ **One to two months.**

☐ **Three to five months.**

☐ **Six months or more.**

A. How much work can he get done? (Worker's <u>ability</u> to make efficient use of his time and to work at high speed.)

☐ 1. Capable of very low work output. Can perform only at an unsatisfactory pace.

☐ 2. Capable of low work output. Can perform at a slow pace.

☐ 3. Capable of fair work output. Can perform at an acceptable but not a fast pace.

☐ 4. Capable of high work output. Can perform at a fast pace.

☐ 5. Capable of very high work output. Can perform at an unusually fast pace.

B. How good is the quality of his work? (Worker's ability to do high-grade work which meets quality standards.)

☐ 1. Performance is inferior and almost never meets minimum quality standards.

☐ 2. The grade of his work could stand improvement. Performance is usually acceptable but somewhat inferior in quality.

☐ 3. Performance is acceptable but usually not superior in quality.

☐ 4. Performance is usually superior in quality.

☐ 5. Performance is almost always of the highest quality.

C. How accurate is he in his work? (Worker's ability to avoid making mistakes.)

☐ 1. Makes very many mistakes. Work needs constant checking.

☐ 2. Makes frequent mistakes. Work needs more checking than is desirable.

☐ 3. Makes mistakes occasionally. Work needs only normal checking.

☐ 4. Makes few mistakes. Work seldom needs checking.

☐ 5. Rarely makes a mistake. Work almost never needs checking.

D. How much does he know about his job? (Worker's understanding of the principles, equipment, materials and methods that have to do directly or indirectly with his work.)

☐ 1. Has very limited knowledge. Does not know enough to do his job adequately.

☐ 2. Has little knowledge. Knows enough to "get by."

☐ 3. Has moderate amount of knowledge. Knows enough to do fair work.

☐ 4. Has broad knowledge. Knows enough to do good work.

☐ 5. Has complete knowledge. Knows his job thoroughly.

E. How much aptitude or facility does he have for this kind of work? (Worker's adeptness or knack for performing his job easily and well.)

☐ 1. Has great difficulty doing his job. Not at all suited to this kind of work.

☐ 2. Usually has some difficulty doing his job. Not too well suited to this kind of work.

☐ 3. Does his job without too much difficulty. Fairly well suited to this kind of work.

☐ 4. Usually does his job without difficulty. Well suited to this kind of work.

☐ 5. Does his job with great ease. Exceptionally well suited for this kind of work.

F. How large a variety of job duties can he perform efficiently? (Worker's ability to handle several different operations in his work.)

☐ 1. Cannot perform different operations adequately.

☐ 2. Can perform a limited number of different operations efficiently.

☐ 3. Can perform several different operations with reasonable efficiency.

☐ 4. Can perform many different operations efficiently.

☐ 5. Can perform an unusually large variety of different operations efficiently.

G. How resourceful is he when something different comes up or something out of the ordinary occurs? (Worker's ability to apply what he already knows to a new situation.)

☐ 1. Almost never is able to figure out what to do. Needs help on even minor problems.

☐ 2. Often has difficulty handling new situations. Needs help on all but simple problems.

☐ 3. Sometimes knows what to do, sometimes doesn't. Can deal with problems that are not too complex.

☐ 4. Usually able to handle new situations. Needs help on only complex problems.

☐ 5. Practically always figures out what to do himself. Rarely needs help, even on complex problems.

H. How many practical suggestions does he make for doing things in better ways? (Worker's ability to improve work methods.)

☐ 1. Sticks strictly with the routine. Contributes nothing in the way of practical suggestions.

☐ 2. Slow to see new ways to improve methods. Contributes few practical suggestions.

☐ 3. Neither quick nor slow to see new ways to improve methods. Contributes some practical suggestions.

☐ 4. Quick to see new ways to improve methods. Contributes more than his share of practical suggestions.

☐ 5. Extremely alert to see new ways to improve methods. Contributes an unusually large number of practical suggestions.

I. Considering all the factors already rated, and <u>only</u> these factors, how acceptable is his work? (Worker's "all-around" ability to do his job.)

☐ 1. Would be better off without him. Performance usually not acceptable.

☐ 2. Of limited value to the organization. Performance somewhat inferior.

☐ 3. A fairly proficient worker. Performance generally acceptable.

☐ 4. A valuable worker. Performance usually superior.

☐ 5. An unusually competent worker. Performance almost always top notch.

S-285 A-P-P-E-N-D-I-X August 1966

FACT SHEET

Job Title: Dental-Laboratory Technician (med. ser.) 712.381

Job Summary: Designs and constructs prosthetic dental appliances. Repairs and reworks appliances according to dentist's specifications. Designs, fabricates and finishes metal framework and clasps for partial dentures; repairs metal piece as required. Constructs, from impressions, porcelain dental restorations or appliances such as jackets, crowns, bridges and inlays. Restores or replaces dontics with plastic or porcelain duplicates. Designs and constructs metal and plastic orthodontic appliances to retain teeth in their proper plan of occlusion in patient's mouth.

Work Performed: Examines work order and accompanying models or impressions submitted by dentist to determine nature of appliance requested, or necessary repair and rework specified; plans sequence of work operations best suited to expedite completion of work order.

Sketches outline of appliance on stone model of upper and lower jaws, being guided by impressions or utilizing a thorough knowledge of oral anatomy and occlusion; aligns model carefully on articulator and secures to frame with plaster; visually checks articulation of upper and lower jaw models to determine if properly aligned and to approximate position and function of appliance to be made. Builds up wax impressions of such appliances as metal frames, crowns, partials and full dentures, contou red wire work and plastic or porcelain restorations with the aid of small hand tools, waxes and open flame of Bunsen burner; checks impressions for proper fit and function in jaw of articulator.

Mixes chemical powders with water to obtain proper investing media; invests models with wax forms and bakes in oven, or boils in water to remove or eliminate wax; packs or casts with such materials as plastic, gold, silver or platinum; removes castings from investment media and positions on original model in articulator to visually check for suitable fit; removes excess material with hand chisel and grinding wheel. Finishes work piece to obtain high degree of lustre and smoothness with the aid of grinding and buffing tools.

Measures depth of undercut in teeth of stone model with the aid of microanalyzer or surveyor which faintly marks in pencil the outline of undercut; blocks out deep undercuts, as necessary, for proper fitting of denture by filling in with wax to areas of undercut; continues operations until all such areas are evenly blocked out. Uses pointed tool on surveying instrument to remove excess wax and to effect a desired vertical or sloping wax surface at base of teeth in model.

Extracts metal coping or framework from plaster mold with hammer and sandblast equipment. Checks fitting of coping on tooth die; smooths surface of coping or metal framework with abrasive grinding wheel to remove burrs and rough edges; critically examines work piece to determine if suitable for application of opaque solution or basic porcelain coating.

Paints tip of tooth die with liquid separating agent; allows to dry and adapts or applies thin sheet of wax to die tip; secures edges of sheet with bulk wax by transferring and spreading with heated applicator; allows covering to set and harden. Removes wax impression and sets in temporary storage area for investing and metal casting.

Fabricated plaster powder until mixture becomes paste-like in appearance, pours or otherwise transfers mixture to cavity of impression as it is held on surface of vibrator, assuring even and thorough distribution into all openings. Fills entire cavity of impression and sets aside for hardening of plaster.

(This sheet is printed in duplicate. One copy should remain as part of the Appendix in order to complete the technical report. The other copy can be removed by employment service personnel who wish to set up separate fact sheet files.)

GPO 913-738

S-285 A-P-P-E-N-D-I-X August 1966

FACT SHEET

Job Title: Dental-Laboratory Technician (med. ser.) 712.381

Job Summary: Designs and constructs prosthetic dental appliances. Repairs and reworks appliances according to dentist's specifications. Designs, fabricates and finishes metal framework and clasps for partial dentures; repairs metal piece as required. Constructs, from impressions, porcelain dental restorations or appliances such as jackets, crowns, bridges and inlays. Restores or replaces dontics with plastic or porcelain duplicates. Designs and constructs metal and plastic orthodontic appliances to retain teeth in their proper plan of occlusion in patient's mouth.

Work Performed: Examines work order and accompanying models or impressions submitted by dentist to determine nature of appliance requested, or necessary repair and rework specified; plans sequence of work operations best suited to expedite completion of work order.

Sketches outline of appliance on stone model of upper and lower jaws, being guided by impressions or utilizing a thorough knowledge of oral anatomy and occlusion; aligns model carefully on articulator and secures to frame with plaster; visually checks articulation of upper and lower jaw models to determine if properly aligned and to approximate position and function of appliance to be made. Builds up wax impressions of such appliances as metal frames, crowns, partials and full dentures, contou red wire work and plastic or porcelain restorations with the aid of small hand tools, waxes and open flame of Bunsen burner; checks impressions for proper fit and function in jaw of articulator.

Mixes chemical powders with water to obtain proper investing media; invests models with wax forms and bakes in oven, or boils in water to remove or eliminate wax; packs or casts with such materials as plastic, gold, silver or platinum; removes castings from investment media and positions on original model in articulator to visually check for suitable fit; removes excess material with hand chisel and grinding wheel. Finishes work piece to obtain high degree of lustre and smoothness with the aid of grinding and buffing tools.

Measures depth of undercut in teeth of stone model with the aid of microanalyzer or surveyor which faintly marks in pencil the outline of undercut; blocks out deep undercuts, as necessary, for proper fitting of denture by filling in with wax to areas of undercut; continues operations until all such areas are evenly blocked out. Uses pointed tool on surveying instrument to remove excess wax and to effect a desired vertical or sloping wax surface at base of teeth in model.

Extracts metal coping or framework from plaster mold with hammer and sandblast equipment. Checks fitting of coping on tooth die; smooths surface of coping or metal framework with abrasive grinding wheel to remove burrs and rough edges; critically examines work piece to determine if suitable for application of opaque solution or basic porcelain coating.

Paints tip of tooth die with liquid separating agent; allows to dry and adapts or applies thin sheet of wax to die tip; secures edges of sheet with bulk wax by transferring and spreading with heated applicator; allows covering to set and harden. Removes wax impression and sets in temporary storage area for investing and metal casting.

Fabricated plaster powder until mixture becomes paste-like in appearance, pours or otherwise transfers mixture to cavity of impression as it is held on surface of vibrator, assuring even and thorough distribution into all openings. Fills entire cavity of impression and sets aside for hardening of plaster.

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